Updated Response to the UARS Committee of Visitors: October 2010

The review of the Upper Atmosphere Research Section held in 2008 was mostly positive. The COV, however, did make some constructive suggestions and recommendations to improve UARS programs. Following are responses to each of these, which were provided initially, and an update as of October 2010:

MAIN FINDINGS AND RECOMMENDATIONS

a. Program Balance

Overall, the UARS program is well balanced. The COV is satisfied with the balance between the sub-disciplines, but notes that Space Weather is a distinct cross-cutting area and it might make sense to create a new program element for space weather. The balance between the observational programs (including major UARS facilities and smaller instruments like magnetometer chains, optical instruments and neutron monitors) is relatively stable, but the COV recommends that a UARS-wide review of this balance be carried out….

Discussion

UARS continuously assesses and evaluates the balance among various programmatic elements. We have discussed creating a new program element for space weather, but the funding level set aside for this activity is still insufficient for a sustained program. So far, the space weather program solicitations have yielded unique and exciting scientific results (the AMPERE project, for example).

ACTION

UARS is committed to maintaining the momentum in this important area of research and we continue to seek opportunities to expand the program.

As for the balance between large and small observing instruments, we are starting to assess current and future needs, beginning with a workshop on September 23-24, 2008, held at MIT/Haystack Observatory. The purpose of the workshop was to discuss those aspects of instrumentation awards that contribute to their being treated as facilities as opposed to individual PI investigations. The workshop was also an opportunity to determine what level of support is needed for current and future observing instruments. The next step in this assessment is to review the information collected and begin discussing a strategy that will maintain a healthy balance of support between large and small facilities. This exercise must also consider the balance between facility support and the grants programs to ensure that individual PI research efforts are not compromised. Advice from the research community, particularly through the CEDAR, GEM, and SHINE Steering Committees, will be an important part of the strategic planning process.

October 2009 Update
Space Weather: ***UARS is pursuing the inclusion of space weather research as a key component of the Dynamic Earth initiative that is currently being discussed within GEO. During the past year UARS has also pursued several opportunities to expand space weather research in international collaborations. Initial discussions with the European Commission on a collaboration focusing on space weather held at NSF in July 2009 were very fruitful and will be followed up by further negotiations aimed at producing a joint solicitation likely to come out in 2010. A similar collaboration has been initiated with the Russian Federation of Basic Research aimed also at a joint solicitation to be issued during 2010.***

Large and small observing facilities balance: ***Nothing further to report at this time***

October 2010 Update
Space Weather: ***The first solicitation in the GEO Dynamic Earth program, renamed to "Frontiers in Earth System Dynamics" was issued in June 2010 and includes several themes that are highly relevant to space weather research. UARS also has initiated a revamping of the Space Weather research program, discontinuing the annual special space weather solicitation. The funds freed up by this will be used to pursue emphasis on and stronger synergy with space weather relevant research in the CEDAR, GEM, and SHINE programs and to be able to redo the joint space weather modeling collaborative competition together with potential partners at NASA, AFOSR, and ONR. Talks and collaboration with the European Commission on space weather are fruitful and ongoing. The collaboration with the Russian Federation of Basic Research is also ongoing but has not yet resulted in a joint solicitation.***

Large and small observing facilities balance: ***Nothing further to report at this time***

b. FDSS
The COV considers the Faculty Development in Space Sciences program the most important new initiative in UARS. It grew out of the recommendations of the NRC Decadal Study for Solar and Space Physics (NRC 2003). While it is too early to judge the success of this program, the early results are very promising. All eight positions were filled with talented young scientists and they are nicely progression toward their tenure review. Some of the new hires are rising stars in their communities and starting to take leadership positions in the CEDAR, GEM and SHINE communities. The COV strongly recommends the continuation of the FDSS program in a staggered manner at the discretion of UARS…

Discussion
UARS is very pleased with the initial success of the FDSS program and appreciates the COV findings of its importance.

ACTION

UARS will continue to monitor the success of each of the candidates as they progress towards securing tenure. We plan to organize a series of meetings starting next summer that bring together all the candidates. These will provide a forum in which to exchange and discuss experiences between the candidates and will highlight common as well as individual challenges and best practices.

UARS will plan for the continuation of the program in a staggered manner as the first set of awards starts to wind down within the next few years and funds become available.

October 2009 Update
Due to time constraints this activity had to be postponed slightly. Plans for a meeting brining together all of the FDSS candidates and their university administrators to access the results of the program and collect lessons learned are in preparation for January or February 2010.

October 2010 Update
Again time constraints for UARS staff as well as the FDSS candidates has lead to postponement on this activity. Plans for a meeting bringing together all of the FDSS candidates and their university administrators to access the results of the program and collect lessons learned are still being pursued.

c. Interdisciplinary research
The new frontiers of science and engineering are clearly at the intersection of several traditional disciplines. This trend is well recognized by the NSF leadership and the Agency is creating several high profile, well funded agency-wide initiatives (like MRI, MREFC, CMG or CDI). It is very important to keep informing the community of funding opportunities that lie outside of UARS. The program directors are doing this, but we stress that they should continue to inform and educate the community about these funding opportunities offered by agency-wide programs.

Discussion
UARS agrees with the COV that it is important for us to work with the community to make the best possible use of the opportunities for cross-cutting funding.

ACTION
UARS will continue and strengthen our efforts to ensure that our community is well aware of and represented in all relevant current and upcoming agency-wide programs. UARS will make a concerted effort to emphasize this in our programmatic presentations at meetings and workshops as well as through community newsletters such as the electronic AGU-SPA newsletter.

October 2009 Update

All relevant announcements for special and/or NSF-wide initiatives have been called out and described in the AGU-SPA newsletter. The importance of engaging in these various initiatives was highlighted to the UARS community during agency presentations at the CEDAR, GEM, and SHINE summer workshops 2009.

October 2010 Update
Nothing further to report at this time.

d. Panel versus mail reviews
There is a general concern in the UARS community (also expressed by the 2005 COV) that there is a tendency to have more review panels. They are appropriate for focused areas, but not necessarily for the broad core programs. The community has more trust in the integrity of the Program Directors and it favors mail reviews.

…It is also recommended that potential reviewers be contacted before proposals are assigned to them. In our view this would make the reviewers more accountable and they would feel more obligated to finish the reviews on time.

Discussion
Review panels are currently used only for the special program solicitations with dead-lines (CEDAR, GEM, SHINE, Space Weather, and CubeSats). We agree with the COV that it is beneficial to make a request to potential reviewers before assuming that they will provide reviews. This is in fact the intent of the standard review request letter being used routinely in UARS. Some Program Managers also make personal requests to potential reviewers to get their acceptance to serve as reviewer before sending them the more formal request letter. This is a powerful but very time consuming way to ensure an adequate provision of reviews.

ACTION
UARS will continue to use panel reviews when appropriate for focused research areas and special programs. We will edit the standard review request letter (email) to make its intent to ask about availability and willingness to provide reviews (to which we expect a yes/no answer) more clear.

October 2009 Update
The wording of the standard review request letters that UARS programs use to solicit mail-in reviews has been changed to clearly state that the purpose of the letter is to ask about willingness and availability to provide a review and asking for a response either way. This has already proven helpful in efficiently securing the necessary number of reviews without unduly burdening the reviewer community with unnecessary requests or the program officers with time-consuming phone calls.

October 2010 Update
Nothing further to report at this time.

e. College of Reviewers

An additional suggestion is to form a "College of Reviewers" with rotating one or two year membership. Each member of the "College of Reviewers" would agree to carry out 5 to 10 mail reviews a year. This would make the mail review process more manageable and would provide a clear "community service" for the members that can be listed in promotion or tenure materials.

Discussion

This idea is similar to the "peer review college" of the British National Environment Research Council (NERC). We see many advantages to this approach.

ACTION

UARS will explore the possibility of establishing an entity like this within GEO.

October 2009 Update

This idea is being discussed with AGS and GEO management. Specifically, UARS is pursuing the possibility of having UARS reviewers sign up for a trial-college on a voluntary basis.

October 2010 Update

There have been recent discussions within AGS to revamp the post-doc programs, making them true fellowships in the traditional sense. As part of these fellowships, AGS is considering the development of a special course for fellowship recipients that would help educate them about the NSF review process and engage them in becoming future reviewers of proposals.

f. Submission deadlines

The COV is concerned about the effect of rolling submission deadlines on the core programs. There were a few very highly rated proposals (including one with all Excellents) that were declined due to the lack of available funds. The COV recommends that UARS should consider the possibility of annual submission deadlines to the core programs (this can be different for the different programs).

Discussion

UARS acknowledges that the rolling submission for the core programs may have some undesirable consequences, especially under the current circumstances of strongly increased proposal pressure.

ACTION

UARS will examine carefully the potential benefits as well as possible disadvantages of introducing deadlines for some of the core programs that are suffering most from increased stresses.

October 2009 Update
Due to the ARRA Fy09 was a very unusual year and as a consequence the deliberations on introducing deadlines have been postponed .

October 2010 Update
Nothing further to report at this time.

g. Additional Program Director
UARS presently has five Program Directors. The COV is extremely pleased with their devotion, integrity, professionalism and enthusiastic support of the UARS community. On behalf of our community the COV wishes thank all of them (and needless to say, the Section Head too) for the excellent job they are doing. It appears to the COV that due to increased proposal pressure in the very successful CubeSat and Space Weather competition areas it would be very beneficial to have one more PD in UARS. This would also make it possible for the PDs to conduct independent research and maintain closer contacts with their communities.

Discussion
UARS shares this assessment and the concern has already been brought up with ATM management. An additional PD for the Aeronomy program has high priority in the current ATM hiring plans.

ACTION
UARS will continue to pursue this request with ATM management.

October 2009 Update
Nothing further to report on this issue

October 2010 Update
An additional PD was employed for 3 months over the Summer of 2010 to provide work load relief, primarily in the AER program .

h. Make UARS a Division
The COV recommends that the Upper Atmosphere Section be changed and a new Division be created within the Geosciences Directorate…

…The Atmospheric Sciences Division has served the UARS community well over the last decades, but recent developments (such as the success and growth of the National Space Weather Program) necessitate the consideration of creating a Division of "Geospace Sciences" within the Geosciences Directorate. The scope of UARS is clearly much broader than just the upper atmosphere. A much more appropriate name would be "Division of Geospace Sciences."

Discussion
There are several recent developments that have brought the upper atmosphere and lower atmosphere closer together scientifically such as the growth of NCAR's WACCM (Whole Atmosphere Coupled Community Model). Nevertheless, UARS represents a well-defined intellectual community that is quite distinct from most of atmospheric sciences and this community needs to be adequately represented at NSF. The creation of a Division would certainly raise the visibility of space physics at NSF and broaden the perceived purview of GEO by the community. This is a major and far reaching recommendation that also needs to be considered in light of "critical mass" – both in staffing and budget.

ACTION
UARS will develop an overarching plan for how such a Division would function within GEO and then present this plan to Directorate leaders for further consideration.

October 2009 Update
GEO management has endorsed the need to raise the visibility of space physics as a unique but key component of Geosciences at NSF. To better reflect this, the name of the ATM division has been changed to Division of Atmospheric and Geospace Sciences (AGS). This change has formally taken place as of Oct.1, 2009.

October 2010 Update
Nothing further to report on this issue.

ADDITIONAL FINDINGS AND RECOMMENDATIONS

aa. Broader impact
The panel found it difficult to judge the broader impact of some proposals and urges the UARS to extract further information on this aspect from successful proposers in their annual reports.

Discussion
UARS acknowledges the difficulty of measuring broader impacts of NSF investments in a systematic and meaningful way. However, this is a general, NSF-wide issue.

ACTION
UARS will examine annual reports more closely to ensure that the broader impacts being proposed are, indeed, being carried out.

October 2009 Update
UARS program directors continue to follow up on this with PIs when approving Annual reports.

October 2010 Update
Nothing further to report on this issue.

bb. CISM legacy
The Center for Integrated Space weather Modeling is the largest and most visible grant in UARS. It is completely "new" money that is coming from the NSF-wide Science and Technology Centers program. It represents a ~10% temporary increment to UARS budget. It is in its 6th year of funding, with 4 more years of eligibility remaining. The COV considers it very important to clearly define the scientific legacy of CISM: what are the science and/or technology innovations that were accomplished by CISM that could not have been achieved without this major new funding. The COV also suggests that UARS should consider the consequences of a sudden ~10% funding drop when CISM ends. It is also suggested that UARS develop a strategy that may preserve the funding level.

Discussion
As part of the renewal process for the Science and Technology Centers, each STC is required to clearly state what its legacy will be at the end of the ten years. This legacy statement is reviewed as part of the renewal proposal as well as annually thereafter by external site visit panels. The main element of the CISM legacy is to work with the broader community toward establishing a community-driven space weather modeling program. Another important aspect of the CISM legacy is to produce a generation of young space weather scientists who are trained in studying the Earth-Sun system as a single, integrated entity with all parts strongly linked by well understood physical processes.

To help CISM achieve its legacy of establishing a community-driven space weather modeling program, UARS helped organize a workshop last summer on the weekend between the CEDAR and GEM/SHINE meetings in Utah. This was a well-attended workshop that provided a forum to discuss various aspects of a community-based space weather modeling program. This workshop has inspired much subsequent discussion and plans are underway for a follow-on workshop.

ACTION
UARS will continue to encourage community-wide discussions on this topic, eventually leading to a report that would present a strategy for how to maintain momentum in space weather modeling post-CISM. Although the CISM funds will be removed from GEO's budget after the 10 year period, we feel it is vital to have a carefully formulated plan in place in this area of space weather research.

October 2009 Update
Discussions on the future needs for space weather community modeling efforts have continued at the Space Weather Workshop in May 2009 and at the CEDAR, GEM, and

SHINE summer workshops 2009. A session to follow up on this is also being planned as part of the next CCMC workshop in January 2010.

October 2010 Update
The need to sustain community modeling efforts in space weather is one of the main reasons for undertaking the revamping of the space weather program discussed earlier.

cc. Satellite data
There is a perception in the UARS community that UARS does not fund work that is primarily focused on analysis of satellite data. Although there are some proposals submitted and funded that use data from current and past satellite mission, the numbers are small compared to the proportion of published papers that analyze satellite data. Due to the evolving funding situation, the traditional support of satellite research by NASA has declined in recent years. This situation leaves a funding gap in this important area. We encourage UARS to clarify this question to the broader community.

Discussion
We agree with the COV that observations from space constitute an important resource for all of the research areas in UARS. As the COV correctly notes, UARS does not actively either discourage or encourage the use of satellite data in proposals but is completely open to their use if the science proposed benefits from such data..

ACTION
UARS will continue our efforts to support the highest quality research over a broad spectrum of research areas. We will continue to allow the use of satellite data for scientific research being proposed – as this is a completely appropriate resource for many of our proposals. We will advice the community at the annual AGU meeting the use of satellite data for research is allowable,

October 2009 Update
UARS has continued to make this point with the community, highlighting also recent NSF investments into COSMIC, AMPERE, and CubeSat projects, which clearly illustrates our commitment to utilize and help provide all necessary observational resources.

October 2010 Update
Nothing further to report on this issue.

dd. Student pipeline
The COV noted that about 200 students participate in the annual CEDAR, GEM and SHINE meetings. In particular, the typical student attendance at CEDAR is ~100. A fraction of the student participants are undergraduates, but the majority is PhD students. The COV applauds the participation of undergraduates as it is very important for ensuring a healthy pipeline of domestic students in the space sciences. While it is clearly

understood that not all space science PhD students will end up in academia or at research institutions, we are wondering if a somewhat smaller number of PhD students at these events would be desirable. The COV recommends that UARS conduct a survey of recent PhDs to see if there is real problem with the student pipeline.

Discussion
UARS does not feel that too many graduate students are participating in these workshops. In fact, we feel the inclusion of graduate students is essential to the vitality of the programs. While it is true that most of the students do not have the opportunity (or even the desire) to pursue an academic position, UARS does not feel that is a requirement for success. We feel that creating a scientifically expert workforce is also a goal and the graduate students fulfill this goal. We have kept close personal contact with many of the students and we are not aware of any graduating workshop student who has had difficulty finding a job although no detailed survey has been conducted.

ACTION
UARS will request the leadership of the CEDAR, GEM and SHINE initiatives to conduct the recommended survey.

October 2009 Update
Nothing further to report at this time

October 2010 Update
Nothing further to report on this issue.

ee. Facilities management
The nature of the Consortium of Resonance and Rayleigh Lidars (CRRL) and SuperDARN require strong cooperation among academic and research institutions and brings together scientific and technical expertise. This innovative concept could be utilized, if proven to be successful, as the model for similar consortia among groups of facilities. Facility consortia could improve scientific and technical productivity while reducing operational costs.

Discussion
We agree that the consortium model for operating facilities has been very successful and shows considerable promise to be more widely used for other facilities. This was a major topic of discussion at the recent facilities meeting at Haystack Observatory. It was clear that SuperDARN and CRRL have benefited from the strong collaborations that accompany this approach to facility operations. Stronger coordination among the incoherent scatter radars has been initiated through the development of a report recommended by a facilities site visit panel chaired by Susan Avery. This report sets the stage for more formal mechanisms for coordination among the facilities. The report will be released in November

ACTION

UARS plans to continue investigating the feasibility of establishing consortia for the operation and management of our facilities. Understandably, this will take some time as the facilities are now at different phases of five-year cooperative agreements. At the Haystack meeting, there was discussion about forming an informal facilities coordination office. If this approach is implemented, we will monitor the activities of this office and help with the coordination efforts when possible, in the hope that this will pave the way toward a more formal consortium approach for the facilities.

October 2009 Update
The joint facilities report was issued in November 2008: "The National Science Foundation's Upper Atmospheric Facilities: Integrating Management, Operations, and Science" and is being used as the basis for continued discussions with the facilities. This was followed up by a dedicated session at the 2009 Summer CEDAR workshop where initiatives on a small Integrated Facilities Office, a Science Committee, and multiple, distributed Skills Teams were discussed in a broader forum. UARS will continue to encourage and follow up on these developments.

October 2010 Update
A proposal to establish an Integrated Facilities Office (InFO) is currently under review. It is anticipated that funding will be provided to initiate some of the more critical functions of the InFO in the coming fiscal year as a testbed for future expansion of the office.

ff. Facility lifecycle
It is clear that some of the UARS facilities are aging. In particular, some of the incoherent radars might have critical failures during the next decade that will necessitate either total replacement or major repairs. The COV recommends that UARS start a planning process for the upgrade, replacement or decommissioning of major facilities. As new facilities (hopefully) come online, the operational costs of all existing facilities might become too high for a balanced program. The COV urges the UARS staff to undertake a long-term planning of the facilities portfolio, including various options.

Discussion
We agree that now is the time to start planning for the future of our facilities. Each of the facilities has undertaken studies for upgrades and replacements, but there has been little effort toward developing a coordinated strategy for all the facilities. The integrated facilities plan noted above touches on some of these strategies, but clearly more work has yet to be done. Of course, these upgrades, and particularly decommissioning, have to be considered in light of the scientific value of the facilities, so parallel efforts to continually assess the scientific contributions of these instruments must also be undertaken.

ACTION
UARS will work closely with the facilities in the development of strategies for upgrades and replacement. We will also ask that the facilities form an internal working group to coordinate strategies, exchange information, and develop a long-range plan.

Eventually, perhaps in two years, this will lead to a planning document that will guide facility decision-making in the future.

October 2009 Update
Nothing further to report at this time

October 2010 Update
A facilities workshop was held in November 2009 and another will be conducted in October 2010. Progress has been made in developing strategies for facility upgrades and replacement, but a long-range plan has not yet been completed.

gg. Data access and archiving
NSF-funded projects have returned a wealth of UARS data sets. The UARS has no stated policy for the archiving and distribution of these taxpayer-funded datasets and should adopt one consistent with NSF and GEO policies, and research community expectations (i.e. free and complete access to data sets and the tools to interpret them). In the absence of such a policy, the data sets may remain inaccessible to the research community, precluding harvest of their full value. Worse, they may be permanently lost upon the retirement or relocation of the PI. The NSF has a designated archive for ionosphere/thermosphere observations known as the CEDAR data center. However, this data center is password protected, does not contain the full range either of individual data sets or data sets acquired with NSF funding, and can be cumbersome to use. Statistics presented at this review indicate that this NSF-funded repository is under utilized.

The COV recommends commissioning of an advisory panel tasked with identifying
1. the most valuable (most requested) data sets acquired by NSF-funded activities,
2. data sets held in the community that are in danger of being lost,
3. suitable repositories (including home institutions linked as virtual observatories) capable of archiving and providing the data sets,
4. suitable technologies for distributing the data set in a manner that would facilitate correlative studies, and
5. the costs involved in transforming the data base into virtual data system easily accessible and usable by the vast majority of users..

Discussion
UARS is working with the NSF-wide Data committee to come up with a policy for how ground-based space physics data can be made available to the community and how it can be archived and curated appropriately. UARS is also coordinating this effort with the NASA Heliophysics Division.

ACTION
UARS will have a meeting where the questions raised by the COV (see questions 1-5 above) can be addressed. Although the NSF-wide data policy revisions have not yet been published, it is expected that the policy will require proposers to specify how they

will make their data available to the public and that annual reports will have to address this issue as well.

<u>October 2009 Update</u>
An initial meeting between UARS and NASA Heliophyics Division program officers on this topic was held in Sep 2008. Some joint data-archiving efforts already exist at the CCMC and in the SuperMAG project and further collaboration will follow the model of these projects. NSF has an ongoing program to develop an agency-wide policy on data access and archiving. The UARS policy on this topic will have to fit into the agency-wide policy once it is announced. The further development of the NSF data policy has been delayed by the loss of some key personnel and by the increased workload in FY09 due to the ARRA stimulus funding. We expect the NSF committee to resume its activities in FY10.

<u>October 2010 Update</u>
An NSF wide change to the implementation of NSF's existing data policy will take effect in Jan 2011. This includes the requirement that all new proposals to NSF include a specific data management plan document, which will be evaluated as part of the review process. Discussions are currently under way to determine which, if any, additional policies or guidelines should be provided for UARS programs as part of this. A second interagency meeting on data handling and data policies was held in June 2010 between NSF, NOAA, and NASA. This meeting made clear that several national data centers run by NOAA and NASA exist that would be relevant for archiving of data produced as part of UARS grants and that NOAA and NASA would welcome and encourage such a use of their facilities. For most projects, this would be done at no or only marginal additional cost. It was agreed that UARS would encourage projects to make use of this as appropriate.